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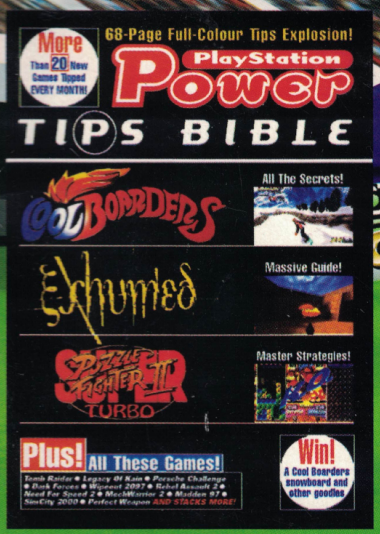

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Yaroze

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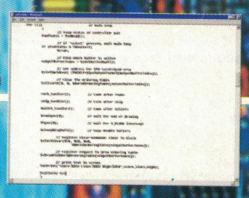


Help

Impossible?

Your mission, should you choose to accept it, is to use Sony's new Net Yaroze PlayStation to program the next PlayStation block-buster. Piece of cake or mission impossible? Daniel Griffiths investigates...

It's NOT 64-bit. It's NOT Sony's answer to the N64. But it IS an extremely interesting piece of hardware, the implications of its arrival are tremendous and it might just make you famous...

It all sounds a little too good to be true. You've seen the pics. You've read confusing news stories. You've waded through turgid interviews with industry nobodies and now, as the finished UK Net Yaroze system goes on sale, the question remains. What is the Net Yaroze and is it any cop?

The Net Yaroze (pronounced Yah-Row-Zay, incidentally) costs £549 and allows you to program your own PlayStation games. Sort of...

The idea is that the Net Yaroze will usher in a new age of creativity, allowing one time gamesplayers to create their own games at home, in much the same way as they did in the early eighties on lesser, now extinct hardware. This could provide the kick up the backside gaming needs after a glut of 3D shooters and racing games.

True, everything you need to program PlayStation games is included in the package but one vital component is lacking - a PC. And it doesn't stop there. This PC will also need Internet access, with all the modem (14,400bps minimum), subscription fees and phone bills this incurs. Seems programming your own PlayStation games could be an expensive hobby. But let's say that aunt Bertha has just gone belly-up, has left you a huge wodge of cash, and you like a challenge, just what can the Net Yaroze do for you?

THE Net Yaroze KIT

The Net Yaroze comes in two separate innocuous packages, one for hardware, one for software. Tip the contents of both boxes onto your floor and this is what you get.

User Guide

This weightier tome deals with basic Net Yaroze operation and programming. It's round about now that some knowledge of C and other such PC malarky is a distinct advantage.

Library Reference Guide

This reference book contains information regarding the in-built PlayStation sound and graphics routines so that you can use them in your programs.

Two-pin continental power supply

The supplied power lead has a two-pin socket on it for our continental chums...

Three-pin plug adaptor

... which is instantly converted for chunky UK sockets with this snappy adaptor plug.

A black PlayStation

A black PlayStation This super-slinky PlayStation is the key to the whole project. It's arresting both to the eye (due to it being black) and to the touch (thanks to it's velvety is-it-rough-or-is-it-smooth textured coating).

Start-up Guide

This skinny booklet details basic plugging in procedure, how to get your Net Yaroze and PC working together and, once your systems are co-operating, how to load a demo program into your Net Yaroze.

SCART block

Use this SCART block on the end of your composite leads.

Composite cables

Use this bunch of three cables to plug your Yaroze into your TV's composite sockets, or use the SCART block above.

Net Yaroze boot disc

Pop this disc into your PlayStation to set it up for Net Yaroze downloading. Without it your Net Yaroze will foolishly think that it's just a normal PlayStation.

Serial I/O comms cable

One end goes into the Net Yaroze's Serial I/O port (normally used for link-up cables) and the other goes to your PC's COM port. Every PC has one of these.

Net Yaroze development disc

The PC side of things is contained on this disc. Copy it's entire contents onto your PC's hard drive (using about 10Mb of space) and run the various programming applications from there.

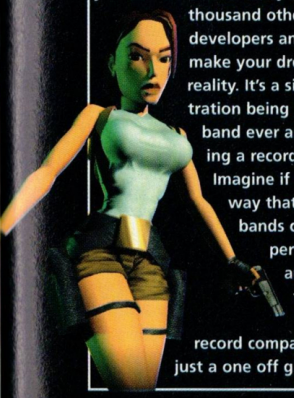
Two matt black joypad's

Sharing the Net Yaroze PlayStation's textured black wrapping, these are the swishest pads around. They work in exactly the same way as the normal pads though.

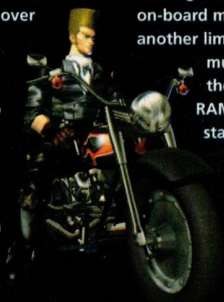
Black memory card

Not a memory card at all but a hardware 'dongle' that will prevent usage of the Net Yaroze unless it's tucked into memory card port one on power-up.

Is the Yaroze for you?



Imagine a game. Imagine the best game ever. Now curse the fact that you don't work for Sony or one of a thousand other developers and can't make your dreams a reality. It's a similar frustration being in the best band ever and not having a record contract. Imagine if there was a way that these bands could perform a gig audienced by the bosses of every record company. And not just a one off gig, but one for every time they wrote a new song. And all for a one off £550 payment. Every band in the land would gladly hand over the cash. Well this is exactly what the Net Yaroze allows hopeful programmers to do. It's all thanks to the Net side of the deal.



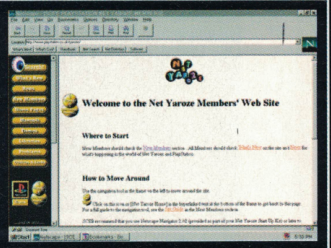
You see the Net Yaroze web site is the ONLY way you can get a game out of your PC/Net Yaroze. You can't cut your own discs to flog down the market. The game exists within your PC's hard drive and is loaded into the black Net Yaroze PlayStation via the supplied serial cable. As far as it's concerned it's loading the game from a CD into its on-board memory. This also imposes another limitation. The whole thing must be shoe-horned into the PlayStation's 2Mb of RAM, the same amount as a standard grey PlayStation and cruelly unaltered for the Net Yaroze. The more you think about it the worse and worse the Net Yaroze looks.

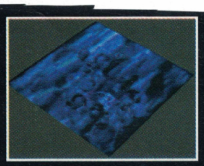
However, this is actually no restriction at all. Think about your favourite games. Think about how often they access the disc. Okay, *Resident Evil* goes at it every ten seconds but *Tekken 2*, for example, only loads between bouts, *Tomb Raider* in between vast levels and, get this, *Ridge Racer* ONCE at the beginning of the game. The whole game, cars, tracks, everything, fits into 2Mb of RAM.

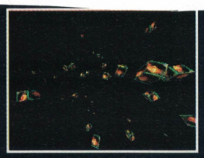
It's therefore possible for a cunning programmer to create a two character *Tekken*-style bout, or a single *Tomb Raider*-style level or

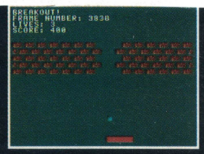
The Net Connection

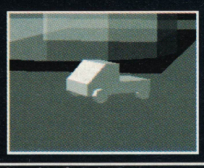
The Net Connection











Graphics demos include some shoot-'em-ups, a few very simple driving games and a polygonal shaded girl you you can rotate then 'explode' at the press of a button.

It can be argued that the Net Yaroze's Net connection is more important than the hardware itself. Rather than leaving you alone in your spare bedroom in Lowestoft to create a classic, access to Sony's Net Yaroze web sight lets you meld minds with similarly far-flung geniuses (geni?) like yourself.

Ask questions, offer solutions, tell everyone about your latest Net Yaroze-related discovery and, of course, stick your finished game on the sight for everyone else to download and play. There are already loads of unofficial web sites for you to pillage or contribute too.

Mind you, you don't have to get involved. You can of course hoard your creations, keeping them shackled in your bedroom for your own personal entertainment but you'd be a miser and a fool in doing so. It's here that you get to air your work to Sony and a host of other watchful developers who have signed up to the Yaroze system, and have a bash on everybody else's games too. And it's all free!

The first part of the web site is packed with info about the Net Yaroze and allows you to order the free Net Yaroze information pack (see below) via e-mail. The second part is for members only and requires the entering of your ID (decided by yourself on your application form) and your password (sent to you by Sony). Pass the test and you're in.

Once inside there are plenty of helpful guides aimed at pointing you in the right programming direction but by far the most tasty bit is the demo section, where you can download hundreds of demos and the work of fellow Net Yaroze owners. And remember it's all free.

At present the software available is somewhat less than impressive (finished games are few and far between) but the more owners there are and the more acquainted with the system they become the greater the quality of software on offer. Here's just a few of the goodies currently on offer.

requirements

Minimum

The minimum specification PC required is a 486 DX2 66Mhz, like the scabby one pictured above. All you need to do is make sure it's got a serial port. Interestingly having a faster or flasher PC is of no advantage whatsoever. Sure it'll compile your C code faster, a process required to turn your program into a form digestible by the Net Yaroze, saving you a couple of minutes, but the finished results are the same since the code runs on the Net Yaroze. The PC merely holds and transfers the data across via the supplied serial cable.

This means that you might be able to pick yourself up a PC bargain and use it with your Net Yaroze. 486 DX2 66Mhz PCs (now getting on for two years old, which is an age in PC land) are going for around £300 second hand these days. Why pay more?

Once you get serious about your Yaroze programming you may want to invest in the CodeWarrior development system produced for the Yaroze by Metrowerks who can be contacted on the web (http://www.metrowerks.com). This makes programming your machine much easier, offering an all-in-one, simple to use Windows 95 solution that also allows you to use a Mac rather than a PC as your host system. The price? At present Sony have an offer where you can have Codewarrior along with your Yaroze for an additional £90.

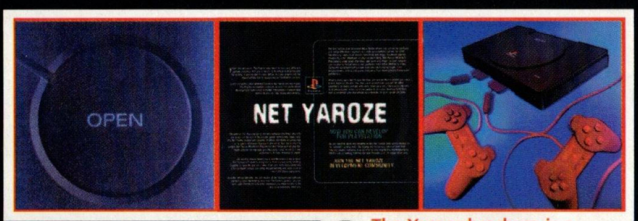
Interested?

There are three ways in which you can buy a Net Yaroze and non of them involve going into a shop and saying "I'd like a Net Yaroze please".

Due to the limited market for the system and the legal side of things (Sony are keeping a firm eye on whether the system takes off and watching out for any emerging stars), Sony are taking care of the entire sales side of things themselves.

Firstly you've got to make contact with Sony's dedicated Net Yaroze department. You can do this by phoning or writing to Net Yaroze Team at the address at the end of this box. Give them the necessary details, ie your name and address and where you heard about the Net Yaroze and they'll send you an information pack with an enclosed application form. This is the ideal stage to mull over your potential purchase. And find the required £549.

Okay, let's just say that you've got the pack, you've got the cash and yup, you've got your heart set on a Net Yaroze. Well, fill in the enclosed form, scrape up your money and bung it to Sony. Cheques are accepted, helpfully. Within 28 days you'll receive a letter acknowledging your purchase and giving you your vital Net Yaroze ID (which you specify) and password which allows you into the exclusive members only part of the Net Yaroze Internet web site. This is sent separately from the rest of the kit, rather like a PIN number and cashcard combo, but within the next few days the actual Net Yaroze hardware and software packs themselves will arrive at your door. Now you're just about ready to rumble.



The Yaroze brochure is a rather glossy and posh affair.

Fancy a swish Net Yaroze info pack? It's free.

Phone 0171 4471616 or write to:
The Net Yaroze Team
Waverley House
7-12 Noel Street
London
W1Z 4HH

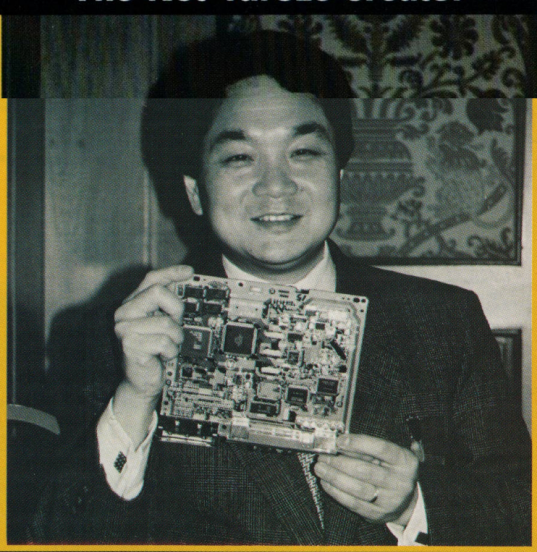
Any disc will do

NTSC	J
NTSC	U/C
PAL	

If all that programming malarky sounds a bit troublesome you can always take solace in the fact that your black beauty lacks any type of country code checking. This pesky software routine checks that the disc inserted is from the same country as the machine, preventing the playing of US and Japanese discs on a UK PAL machine and vice versa. With the Net Yaroze the world is your lobster allowing you to buy the latest Japanese and American games often months ahead of a snail's-pace UK release. *Final Fantasy VII*, for example, has been available in Japan (and in the UK via import shops) since February!

The clever Net Yaroze senses the PAL (UK) or NTSC (US and Japan) origin of the disc and wisely chucks out a colour picture for you too. How kind. One thing that it won't do is play gold pre-release discs, but then these are only for use in the software industry (although some have been leaking out into playgrounds across the land thanks to unscrupulous pirates) so don't let that worry you.

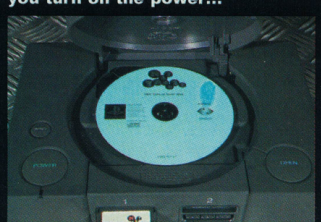
The Net Yaroze creator



It's a set up!

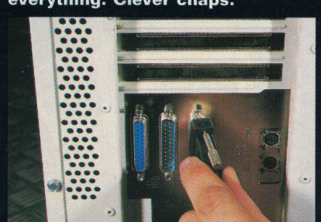
1 Set up your Net Yaroze as you would your normal machine then insert the Access Card. Ownership of the card proves that you're a legit Yaroze owner and without it your Net Yaroze is a useless lump of plastic.

2 Next step, pop the Net Yaroze boot disc into the PlayStation. When this disc has loaded your PlayStation will sit like a lemon patiently waiting for contact with your PC. But before you turn on the power...



3 Plug one end of the communications cable into the serial I/O port on the Net Yaroze. It's on the back y'know. It's the port previously reserved for use by the serial link-up cable in link-up games.

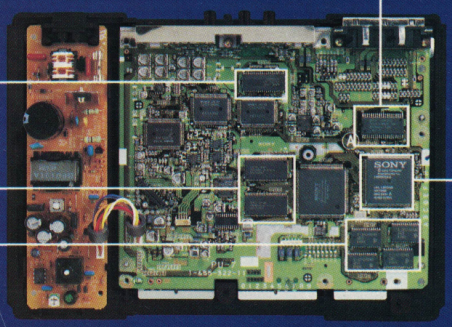
4 Stick the other into the COM port of your PC. This is usually a small 9-pin port but a fifteen pin adaptor is supplied should your crumbly PC require it. Seems they've thought of everything. Clever chaps.



Inside information

Internal memory chips

From top to bottom there is 512K sound RAM, the 1Mb video RAM and the 2Mb DRAM which is the bit you have to squeeze your programs in. It's all exactly the same as the grey standard PlayStation. Which is a bit of a pity really.

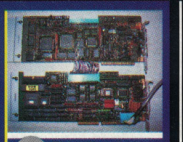


Operating system ROM

This is what really distinguishes the Yaroze from the grey machine. The new operating system allows for PC contact via the serial I/O port.

Black memory card

The Yaroze's central processor is identical to the standard PlayStation's 33Mhz R3000 chip.



This pile of rubbish is the £10,000 PlayStation development kit.

The sleek and sexy Yaroze makes it look a bit daft doesn't it?

Ken Kutaragi

The Net Yaroze is the work of Sony's Ken Kutaragi. Who the hell's he? Well, he's the bloke that invented the PlayStation. Yup, it's all down to Ken.

Way back in the mists of time, after building televisions, video tape recorders and perhaps most famously the Walkman, Sony founded a TV broadcasting technology division. Ken Kutaragi headed the project and invented an image manipulation system called System G which was used to produce tacky seventies TV image warping and whizzing effects a la Bohemian Rhapsody.

When Nintendo wanted CD technology for their aging (now deceased) SNES console they asked Sony for help, who wheeled out Ken and the System G team as proof of their graphics know how. When the deal for the CD drive fell through Ken convinced a gutted Sony that he could come up with a console of their own, rather than waste the work he'd already done. Best of all, without the 16-bit SNES ties he could go mad and create the ultimate console. And so the PlayStation was born.

Now he's created the Yaroze – a programmable PlayStation aimed at getting new talent and new ideas back into games. Thanks Ken.

Yaroze

Internally the Net Yaroze is identical the grey PlayStation you own already. It has the same processors, the same memory chips, the same CD drive - everything. There are only two differences between the Net Yaroze and your basic model. One, it has different boot ROMs and two it has the ability to bypass the CD drive in favour of downloading data via the serial I/O port via the communications cable. Oh, and it's black as well. That's it. And it costs £550?! Sheesh...

More important are the differences between the Net Yaroze and the full-on development system, used by developers the world over to make PlayStation games. These are surprisingly few.

First of all the Yaroze comes as a separate, fully functioning PlayStation rather than as a chunky card for fitting inside a PC. There's also less RAM available (see above) meaning that rather than being able to create huge games then cut it into loadable 2Mb chunks you have to plan ahead to squeeze whatever you want within these boundaries.

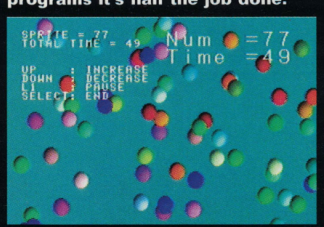
There's no extra RAM for debugging, a program that (ideally) runs alongside the C compiler reporting on any errors that have occurred and so on. And finally there's no CD ROM emulator, a clever program which will feed the PlayStation with data at the speed of a CD drive enabling programmers to see if they're being unreasonable with their disc accessing.

Finally the libraries of graphics tricks available is slightly reduced and some intricate modelling routines are missing, meaning that constructing intricate 3D models, such as *Tekken* characters is currently very tricky, but *just* possible if you're persistent.

Still, what did you expect for £549? Beats shelling out £10,000 for the full system anyday!

5 Switch on your PC, lob in the Net Yaroze development disc and copy the programs contained thereon onto your hard drive. Follow the instructions in the Start Up Guide to get your machines working together.

6 First job is to send the demo program down the wire into the Net Yaroze. Voila – loads of coloured balls bouncing around the screen. Once you know how to load and run Net Yaroze programs it's half the job done.



Sure you want a Yaroze?

Tempted by the Net Yaroze?

£550

is a lot of money and when you add in the cost of a decent, modem equipped PC (£1500 approx) you've got a £2050 bill on your hands. That's an awful lot of PlayStation games.

51 in fact, and here's what they look like. Still tempted?

P 65

Yaroze Mission Impossible?

Easy as a PC?

So, do you need to be a PC whizz to get anything to happen? Unfortunately the answer is quite possibly. Setting up your PC and Net Yaroze involves letting it know which COM port your modem is on and at what baud rate it transfers data. If you're lost already best rethink that Net Yaroze purchase.

At present the software used to send programs to your Net Yaroze is a DOS program (an unfriendly on-screen text-based way of communicating with your computer) and Windows 95 (the PCs most popular and friendly operating system) doesn't get a look in. It's a shame because you'll be using Windows 95 to access the Net side of the deal, uploading and downloading programs, but must then switch to scabby DOS to send them to your Net Yaroze. The Codewarrior system mentioned earlier is a far friendlier Windows 95-based system but remember that this only makes obtaining results slightly easier rather than necessarily quicker or better. The choice is yours.

One worthy feature is that included on the PC Net Yaroze development disc is a 28 day free subscription to the PIPEX Internet service provider (after which it's £12.99 a month) and will allow you to get 'on-line' as they say.

Sure, following the Start-up guide will tell you the necessary DOS commands to make contact but even at this stage it's all frighteningly awkward. Round about now getting your Net Yaroze to do anything will seem like a minor miracle so getting it to run the demo which causes 1500 shaded, multi-coloured balls to ricochet across the screen will cause you to crack open the ginger beer in celebration. Initial euphoria over, it's time for the tricky stuff...

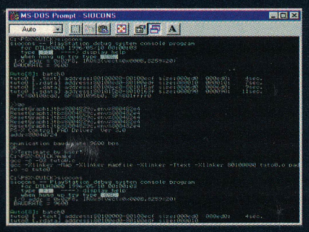
Let's start programming!

Net Yaroze comes with a C compiler. C is a fast and efficient language, ideal for games programming. A large number of specially written C functions are supplied to control the hardware, and these, thank Jehovah, take care of most of the hard work.

Source code is compiled within your PC by the GNU C Compiler (or the Metroworks system if you shell out the extra for it), and the compiled code sent to your Yaroze PlayStation by a DOS program called Siocons. This utility will also start the programs running once there are transferred.

In practice, the C source code is entered using whatever text editor you have to hand (even Windows Notepad will do), then saved and compiled. The compilation takes only a few seconds and is the one part of the system where your PC's processor speed will make a difference. Mind you, even large programs will only take a minutes or so and with shorties it'll take longer to transfer the data to the Yaroze than to compile.

Separating the system used for writing the code and the system used for running it, makes for an ideal development system. No matter how bad the bugs in your program, the PC will never crash. You can also make use of the GNU debugger utility to examine your code line-by-line, or simply insert print statements at vital points - these can be used to display the contents of in-game variables (life remaining/ammo/screen position) on the PC screen.



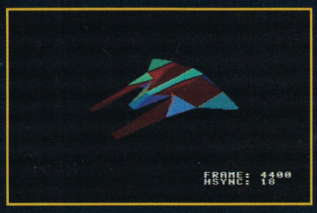
The powerful libraries supplied means that programming the PlayStation is remarkable easy: much simpler than programming the PC or Amiga for example which require you to do so much more. If you want to dig deeper, it's possible program the PlayStation in Assembler directly - although I think I'll leave that for the time being...

An introduction to PlayStation graphics

The PlayStation has some amazing graphics facilities, and these are all available to the Net Yaroze programmer. The core of the graphics system is the Framestore. All the sprite and texture information is kept in the Framestore, a separate area of memory which the CPU can't access directly. Special library routines are used to copy data to the Framestore and to create all the objects you need to display.

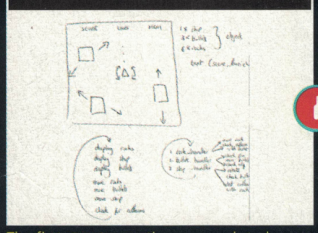
The graphics hardware includes direct support for double-buffering (to keep your graphics smooth and flicker-free), and because you can give each object a priority, it includes depth-cueing so that objects which are further away will be hidden by those closer to the player.

Most programs will run on a frame-by-frame basis: that is, all the code will be executed in the time it takes for a video frame to be displayed. There are plenty of other advanced features too, such as the ability to use transparency, and making your objects fade into the distance as they travel away from you. You can also make use of the 3D engine to display solid or texture-mapped 3D objects. The PlayStation also has a 24-bit mode for displaying images with over 16 million colours. As far as we are concerned, this is for still images only (intro screens etc). If you have a video digitiser you can use this facility to get pictures of yourself into the action!



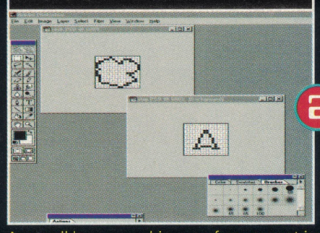
Fifteen steps (and six hours) to writing a PlayStation Game

Sketch out game plan



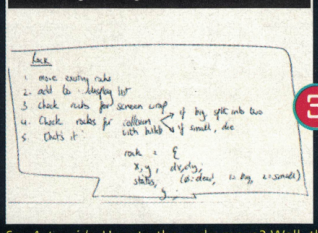
The first step to creating a game is to have a rough idea of what you want. Obviously the game will change and evolve as you are writing it, but having a good plan will help you determine what your goals are, and what is actually possible with the PlayStation's hardware. By sketching out what actually happens in the game, you can get an idea for the programming involved and start to piece together the "logic" behind it all. We decided for a game of our old arcade favourite (and easy to program) *Asteroids*.

Design graphics for game



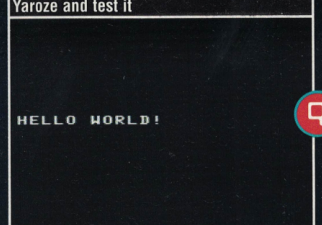
As we all know, graphics are of paramount importance. The look of a game sets the scene, so it's worth spending time on this part (as we obviously didn't). You need to design the appearance of every object which appears in the game, either on paper or using a graphics program such as PaintShop Pro or Photoshop. At this stage you also need to decide upon the resolution of graphics mode you are going to use and the number of colours which are to be displayed. Sprites can either have 16 or 256 colours.

Work out game logic



So, *Asteroids*. How to the rocks move? Well, they are sprite objects so they have an X and Y co-ordinate. This all needs to be though about and planned out before you can even begin any real programming. We'll make them drift around the screen until they get to the edge, and then start again. At this stage we need to write down how the game works - not in programming language, but in a plain step-by-step way which makes sense. A flowchart, if you will. It'll make writing the actual program much easier in the long run.

Write skeleton game code, zap it to Net Yaroze and test it



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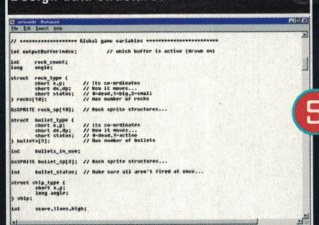
It's time to get the Net Yaroze up and running. The link between the PC and the Yaroze is a serial one, and by default this is 9600bps: not amazingly fast. If you have a memory card in slot two on the PlayStation you can store other default speeds - up to a much faster 115200. The first program is a very simple one, and is only to check that everything is working properly. The C compiler is called with the "Make" utility, and the "Siocons" program is used to blast the data to the PlayStation and start it running.

Design data structures



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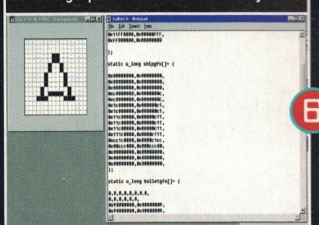
With a language such as C, it's important to spend time designing the data structures which will hold vital information about the elements in your game. For example, each rock in the asteroids game will need to remember its position (the X and Y co-ordinates), the direction in which it is moving, and its status (blown up, a large rock or a small rock). As there will be more than one rock, we create an array: which a "super variable" able to store this information for all the rocks we need.

Convert graphics into suitable binary code



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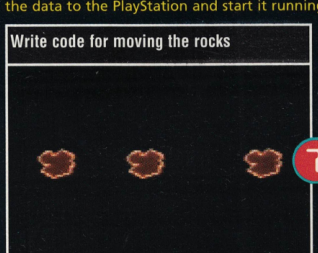
All the graphics which we so carefully designed need to be converted into data suitable for inclusion into the program. The Net Yaroze system comes with utility software to covert images stored in familiar format such as BMP into the PlayStations own format. In this game however, we'll do it by hand - converting each pixel in the graphic into a suitable number. These number is included, in a special order, in a C structure which will define the shape. Tricky sounding, yes, but quite logical in practice.

Write code for moving the rocks



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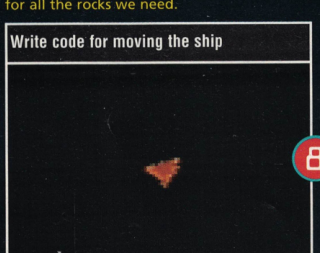
Now we can start the real programming. Using the game logic we sketched out the programming isn't as hard as you might think. C is quite a straightforward language and a lot of the code is simply concerned with initialising the sprites. The Yaroze comes with a large library of functions which perform all the vital work, such as drawing the sprites or reading the controller. Up to now it's taken about two hours, and most of that is spent trying to find the necessary libraries in the reference books which cleverly aren't in alphabetical order!

Write code for moving the ship



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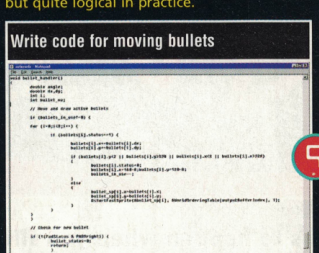
The PlayStation hardware is capable of many tricks. One of them is the ability to rotate a sprite by a given angle - this makes moving the player's ship very easy. All we need to do is read the controller, check to see if the left or right buttons are pressed, and if they are increment or decrement the angle of the ship sprite. The PlayStation will change the sprite graphics for us automatically. It's also possible to scale the sprite up or down for instant 3D effects, but we'll leave that for the time being.

Write code for moving bullets



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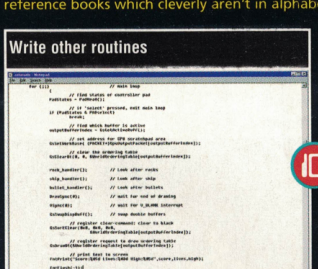
The final element in our Asteroids game is the player's bullets. Once again, these are simple sprites. The tricky part is working out which direction to move them - but if you remember your GCSE maths you will realise that we can use Sin and Cos to convert the angle of the ship into values required to alter X and Y position of the bullets. The rest of the bullet code is concerned with updating their position. Oh, and making sure the player needs to let go of the fire button before firing again - we don't want to make it too easy.

Write other routines



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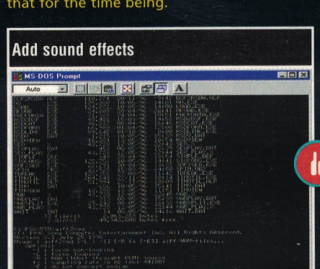
We need to add a few other features to the game: for example, the player's score and number of lives. Printing text is easy, as we can use the a very similar function to C's own "printf". If you use an ordinary printf, the text is displayed on the PC's screen: this is great for debugging the program. We also need to write the collision detection routines, as the PlayStation sprites don't include this facility. This requires quite a lot of tricky coding - it's taken us about three hours and some unnecessary hair-pulling to get this far.

Add sound effects



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With the bulk of the game completed, it's time to turn our attention to the sound effects. Once again, the Net Yaroze library contains all the functions we need to trigger the sound effects when the player fires, or when a rock is hit or even for creating our own musical soundtrack. Utilities are provided to convert standard PC WAV files into PlayStation format so you can easily sample your own effects via your soundcard or use any of the millions of 'blips' and 'ftangs!' you have cluttering up your hard drive.

Add different phases to the game

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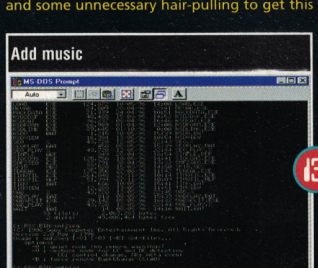
Currently the game all runs within one loop: when you run it, the game starts at once and you're fighting for your life. We need to expand this to provide several phases. These include a "Press Start to Play" message, the game itself, a High Score table and maybe even an attract mode. You can also start to play with adding different levels of difficulty, and even secret options. Let's stick with something pretty simple for now, such as the displaying of a famous logo while we're waiting for someone to hit the start button.

Add music



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The PlayStation can play music directly from CD but we're not able to mess with that bit thanks to the fact that the CD drive is entirely out of bounds. Phooey. Fortunately we have full access to its MIDI synthesiser. If you want to add some music, utilities are provided to convert Standard MIDI Files into a format which the PlayStation can play directly. This means you can use any MIDI sequencer program to compose music especially for your game.

Add special effects

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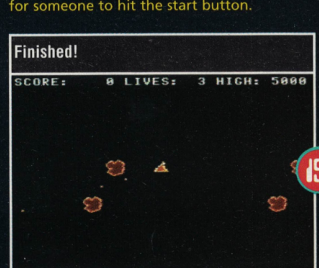
After five or six hours, we are definitely into the polishing stages. Time for some special effects. When the player's ship is hit, we need a huge explosion - this can be achieved by drawing ten frames or an orange fireball growing and dispersing, and replaying this several times simultaneously. We can also add twinkling stars or even a background drawing to liven up the graphics a little. We set it up to display this frame for a moment, indicating you demise.

Finished!



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With everything finished, it's time to take a well earned rest and show our blockbuster to the rest of the world. You can do this is two ways: get all your mates round and show them, or upload the finished game to the Net Yaroze Web site and share your work with other PlayStation programmers. This is the best way to get feedback, pick up some hints and tips and maybe even get discovered by a major software house. Good luck!

So should you buy one? Only if you know a thing or two about C and PCs and fancy replacing all your existing hobbies with Yaroze programming! If that's you, good luck. The world awaits.